

4.2 Systems by Substitution 4.3 Systems by Elimination

- 1) Solve Systems by Substitution
- 2) Solve Systems by Elimination

Lesson objectives

Teachers' notes

Subject: Systems of Equations

Topic: Systems by Substitution & Elimination

Grade(s): Intermediate Algebra

Prior knowledge: Isolate variables
Solving Systems by Graphing

Cross-curricular link(s): Type text here

Lesson notes:

Type text here

Lesson objectives

Teachers' notes

Warm Up

- Solve the following system of equations using the graphing method

$$\begin{cases} y = x - 2 \\ -x - 2y = 1 \end{cases}$$

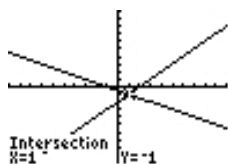
$$\begin{array}{r} -x - 2y = 1 \\ +x \quad +x \\ \hline -2y = x + 1 \\ \quad -2 \quad -2 \\ \hline \end{array}$$

$$\therefore y = -\frac{1}{2}x - \frac{1}{2}$$

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Plot2 Plot3
V1=X-2
V2=(-1/2)(X+1)
V3=
V4=
V5=
V6=
V7=

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Substitution Method

- Steps
 - Choose one equation and isolate one variable
 - Substitute the value obtained in step #1 into the variable in the other equation and solve
 - Substitute the value obtained in step #2 into either original equation and solve
 - Write solution as an ordered pair

$$\begin{cases} y = x - 2 \\ -x - 2y = 1 \end{cases}$$



Example

$$\begin{cases} y = x - 2 \\ -x - 2y = 1 \end{cases}$$

1. $y = x - 2$ 2. $-x - 2y = 1$

1. Solve 1st equation for "y"

$$y = x - 2$$

$$y = x - 2$$

2. Substitute new "y" value into 2nd equation and solve

$$-x - 2y = 1$$

$$-x - 2(x - 2) = 1$$

Example

$$\begin{cases} y = x - 2 \\ -x - 2y = 1 \end{cases}$$

1. $y = x - 2$ 2. $-x - 2y = 1$ 3.

$$y = x - 2$$

$$-x - 2(x - 2) = 1$$

$$-x - 2x + 4 = 1$$

$$-3x = -3$$

$$x = 1$$

Example

$$\begin{cases} y = x - 2 \\ -x - 2y = 1 \end{cases}$$

1. $y = x - 2$ 2. $-x - 2y = 1$ 3. $y = x - 2$

$$y = x - 2 \quad -x - 2(x - 2) = 1$$

$$-x - 2x + 4 = 1$$

$$-3x = -3$$

$$x = 1$$

3. Substitute new "x" value into either original eq'n and solve

$$x = 1$$

$$y = x - 2$$

$$y = 1 - 2$$

$$y = -1$$

Example

$$\begin{cases} y = x - 2 \\ -x - 2y = 1 \end{cases}$$

1. $y = x - 2$ 2. $-x - 2y = 1$ 3. $y = x - 2$

$$y = x - 2$$

$$-x - 2(x - 2) = 1$$

$$-x - 2x + 4 = 1$$

$$-3x = -3$$

$$x = 1$$

$$y = 1 - 2$$

$$y = -1$$

4. Write Solutions as Order Pairs

$$(1, -1)$$

You Try...

$$\begin{cases} y = 3x - 1 \\ 2x + y = 4 \end{cases}$$



You Try...

$$\begin{cases} 4x + y = 2 \\ x - 2y = 3 \end{cases}$$



You Try...

$$\begin{cases} 10x - 2y = 6 \\ y = 5x - 3 \end{cases} \quad \begin{cases} 2y = x + 6 \\ 2y + 14 = x \end{cases}$$



Elimination Method



Elimination Steps

- Put the Equations in Standard Form
 - Variables on one side, constant on the other
- Add or Subtract to Eliminate a Variable
 - May need to multiply by a constant 1st
- Solve remaining Equation
- Substitute value into either original and solve
- Write solution as ordered pair



